Assessing the value dimensions of outsourced maintenance services

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Assessing the Value Dimensions of Outsourced Maintenance Services

Amir Toossi, Network Rail, Milton Keynes, UK

Helen Louise Lockett, School of Engineering, Cranfield University, Bedford, UK

Jawwad Z. Raja, Department of Operations Management, Copenhagen Business School, Frederiksberg, Denmark, and

Veronica Martinez, School of Management, Cranfield University, Bedford, UK

Abstract

Purpose- The purpose of this research is to investigate the diverse nature of tangible and intangible value dimensions that contribute to customers' perception of value from outsourced maintenance services.

Design/methodology/approach- A multiple case study approach has been adopted. Repertory grid, an in-depth structured interviewing technique, has been used in order to draw out the respondents' hidden constructs in evaluating outsourced maintenance services. Data has been collected from four customer organizations of outsourced maintenance services, and a total of 33 interviews have been undertaken.

Findings- The research has identified a range of tangible and intangible value dimensions that are of importance in maintenance outsourcing decision-making. The most important value dimensions for maintenance outsourcing were found to be specialist knowledge, accessibility (of the service provider), relational dynamic, range of products and services, delivery, pricing and locality. Although we have identified the most important value dimensions we also emphasise the need to take into account the full range of value dimensions in order to understand the whole value pattern in an organization.

Practical Implications- The results will be of use for maintenance service providers to help them to improve value adding capacity of maintenance services. The results can also be applied by customers to help them assess the value they receive from outsourced maintenance services.

Originality/value- A different perspective on maintenance outsourcing value is provided. The value patterns in different organizations and the viewpoints of respondents in different organizational roles are described. The dynamic nature of these tangible or intangible values over time and their interrelationships has also been explored.

Keywords Maintenance Management, Outsourcing, Value-in-use, Repertory grid, Servitization

Paper type Research paper

Introduction

The intense global competitive environment has led many manufacturers to differentiate themselves by applying a service-oriented business strategy. In a traditional product-oriented mindset, organizations may offer supplementary services as add-ons to their existing manufactured products; whereas in service-oriented business logic, companies move to providing integrated bundles of products and services. Such a change, called servitization (Vandermerwe and Rada, 1988), entails suppliers "moving away from the transactional business imperative and offering more integrated and value adding services to their customers" (Auramo *et al.*, 2004) which can result in sustainable profit margins higher than product sales (Patton and Bleuel, 2000; Auramo *et al.*, 2004). This phenomenon is also commonly referred to as product-service offerings, integrated offerings, bundles or Product-Service Systems (PSS). It differentiates the market oriented value creation approach and is defined as "an integrated product and service offering that delivers value-in-use" (Baines *et al.* 2007). This research focusses on the provision of outsourced maintenance services, which is a common form of PSS for engineering manufacturers.

In parallel with the trend towards servitization, the maintenance management paradigm has shifted from viewing maintenance as a necessary evil which "costs what it costs", to a cost that can be "planned and controlled" and, finally, to a part of the business process which "creates additional value" (Parida and Kumar, 2006). Recently, it has been argued that maintenance has intrinsic value and there is an emerging view that maintenance not only reduces business risk, but should also be seen as a value-adding process (Marais and Saleh, 2008; Rosqvist *et al.,* 2009). This "value-centric" view is in contrast with the traditional

"cost-centric" view in which the benefits of maintenance have mostly been considered as avoiding the costs of failure (Al-Najjar, 2007). It is therefore important for suppliers of maintenance services to understand and assess the value-creating dimensions of maintenance in order to design more value adding services. According to Anderson and Narus (1998), "to persuade customers to focus on total costs rather than simply on acquisition price, a supplier must have an accurate understanding of what its customer value, and would value". This assessment would help suppliers of maintenance services to discern which areas of the provided service could be tailored and improved in order to escalate their customer's value perception and help them to gain new customers by applying their knowledge of maintenance value in their marketing efforts. This approach would help companies to "better sustain customer relationships by documenting its delivery of superior value over time and by discovering new ways to update and reinvigorate those relationships" (Anderson and Narus, 1998).

From the customer's point of view, the traditional motivation to outsource non-core maintenance activities is to allow them to concentrate on their main business objectives and competencies (Levery, 1998). According to Keeney's (1994) 'value-focused thinking', value is fundamentally important in any decision situation, and should be used as the basis for decision-making. But as Anderson and Narus (1998) assert, "many customers…understand their own requirements but do not necessarily know what fulfilling those requirements is worth to them". Therefore a better understanding of maintenance value will help customers to have reliable decision-making criteria for outsourcing their maintenance functions.

This paper provides a new perspective on the complex nature of maintenance value. It is structured as follows: Section 2 provides a review of value definitions from the academic literature. Section 3 outlines the research methodology and data collection approach. The

results are presented in Section 4. Finally, the conclusions and future research needed are addressed in Sections 5 and 6.

Value-in-use of Maintenance Services

In order to understand and measure value in practice, it is essential to have a common definition of value. In the literature, value has been defined based on the concept of monetary worth or perceived benefits versus sacrifices (Zeithaml, 1988; Monroe, 1991). For example, Anderson and Narus (1998) define value as the "worth in monetary terms of the technical, economic, service, and social benefits a customer receives in exchange for the price it pays for a market offering", whereas Parasuraman (1988) define it as: "A comparison of what customers think a company should offer (i.e. their expectations) with the company's actual performance". More recently, Vargo and Lusch (2004) argue that assessing customer value requires defining the context in which it is perceived. They assert that in traditional goods centred dominant-logic value is embedded in the product and is defined by the producer (also known as "exchange value"). In the service dominant-logic proposed, the customer is seen as a co-producer of service and the value is perceived and determined by the customer in terms of value-in-use (Vargo and Lusch, 2004). According to the service-dominant logic, customers are active participants in relational exchanges and value is *always* co-created (Vargo and Lusch, 2004). MacDonald *et al.* (2011) build on the work of Woodruff (1997) and Vargo and Lusch (2004) to provide a more concise definition of value-in-use as: "A customer's outcome, purpose or objective that is achieved through service". In this research, we examine what the customer understands by value-in-use of maintenance. As Dekker (1996) asserts "next to energy costs, maintenance spending can be the largest part of the operational budget. Yet…whether its output is produced both effectively, in terms of contribution to company profits, and efficiently, in terms of manpower and materials employed, is very difficult to answer". Furthermore, most previous research into maintenance value has focussed on the

technical and financial benefits at strategic and operational level (Al-Najjar, 2007). However, there are elements of in-tangible and soft values that are as important in decision-making as tangible values (Liyanage and Kumar, 2003; Markeset and Kumar, 2004).

In essence, we argue for the need to understand the value-in-use of maintenance attributed by customers in the context of servitized offerings, rather than the value which is perceived at the point of sale (Macdonald *et al.,* 2011). Also, value-in-use needs to be assessed in a way that it can be used as an input to design and improve the value adding services to boost customer satisfaction, rather than just another quantitative performance indicator which could not effectively benefit improving the provided maintenance services (Toossi, 2011). We emphasize the need to understand the value dimensions which create the perception of benefit and/or sacrifice for the customer and which may be of tangible or intangible nature. The research methodology adopted for this assessment will be described in the following section.

Research Methodology

Case Description

An exploratory qualitative approach has been adopted in order to investigate the dimensions of value for outsourced maintenance services. We conducted an in-depth case study research with customers of one of the global leaders of automation and control systems with 20,000 employees in more than 450 sales/support locations in approximately 80 countries (hereafter referred to as Service World). The UK services division is responsible for managing the outsourced maintenance function for its customers and has more than 150 employees and £28 million sales (based on 2008 company data). The services offered include asset management, integrated condition monitoring, remote monitoring, onsite support, phone support, repair

services, training and service assessments. Service World's service contracts promise their customers reduced costs, optimized asset usage and improved productivity.

This paper investigates four different customer organizations that have outsourced part of their maintenance operations to Service World. These manufacturing companies range across different sectors: medical equipment, pharmaceutical manufacturer, insulation material and a specialist metal products manufacturer. The length of customer companies' relationships with Service World ranges from one to four years (see Table 1). For confidentiality, we name these companies respectively: MedicaCo, PharmaCo, InsulaCo and MetalCo.

The services evaluated in this research are maintenance management services including data administration, calibration of equipment, inventory management, warranty tracking, systems integration and repair management. These services are managed by an on-site Service World engineer referred to as the Service Representative.

Table 1. Service Customer Companies details

Company	Length of relationship (year)	Range of services
MedicaCo	3-4	Asset Management, phone support, repair services
PharmaCo	1-2	Asset Management, phone support, repair services, condition monitoring
InsulaCo*	1-2	Asset Management, phone support, repair services
MetalCo	1	Asset Management, phone support, repair services

Data Collection Methodology

In accordance with Voss *et al.* (2002), semi-structured interviews have been conducted with Service World to understand the business, as is normal in the exploration stage in case research. For the main study, interviews were conducted with customers of Service World.

Initially, open ended questions have been asked from the interviewees in the customer organizations in order to understand their role. These lasted 15 to 20 minutes with each interviewee. This was followed by the repertory grid technique being used with customer organizations as the main data collection tool. Repertory grid is an in-depth interviewing technique which is used to elicit the personal perceptions about an aspect of reality or phenomena (Jankowicz, 2003; Fransella *et al.,* 2004). This technique is especially useful for situations where it is hard for interviewees to articulate their ideas and experiences with clarity (Lemke *et al.* 2003). It is based on Kelly's (1955) Personal Construct (PCT) theory, which assumes that people construe internal representations of the reality they experience. The technique enables the researcher to capture the mental map of how the respondent construes the world, through constantly comparing and contrasting how the respondent interprets and re-interprets that which is important to them in their lives (Kelly, 1955). It allows for a deeper exploration of the subject matter whilst restricting interviewer bias (Goffin *et al.,* 2006, 2012).

The application of the repertory grid technique is briefly summarised as follows. The interviewee was asked to name at least 6 suppliers of maintenance and repair services that they were familiar with, including the focal firm Service World; these suppliers are referred to as elements. In the next step, the elements (names of suppliers) were compared in random triads (Fransella *et al.*, 2004; Goffin *et al.*, 2006) by asking the question *"Can you think of any ways in which two of these suppliers are similar to each other and different from the third in terms of the outcomes you get"*. The response was captured as a construct in the words of the interviewee e.g. one of the suppliers has "good quality of repairs" versus the other two suppliers which provided "poor quality of repairs" (see Figure 1). The interviewee was then asked to rate all the suppliers on a scale of 1 to 5 against the elicited construct (Tindall, 1994; Gammak and Stephens, 1994 and Goffin *et al.*, 2006) and the results are

recorded on a grid as shown in Figure 1. This process was then repeated using another randomised combination of triads until no more meaningful constructs could be elicited. The repertory grid technique is described in more detail in Jankowicz (2003).

Order of personal constructs 5,1,6,4,2,3

	..1.. Constructs	Element-suppliers: Supplier A	Supplier B	Supplier C	Supplier D	Supplier E	Supplier F	..5.. Poles
1	Good quality of repairs	2	2	4	2	2	3	Poor quality of repairs
2	Being local	3	3	1	1	2	3	Distant
3	Specialist knowledge	1	1	2	1	2	1	General knowledge
4	On-site representative	4	5	4	2	1	5	Off-site
5	Good response time	2	2	1	1	1	2	Poor response
6	Good relationship with supplier	1	2	1	1	1	2	Not so good
7	Transparency in cost	4	4	2	3	2	4	Not so clear in cost

Fig. 1. Example repertory grid (interviewee: a maintenance technician in PharmaCo company)

Repertory grid interviews were conducted with respondents with different backgrounds and varying degrees of seniority within the respective customer organizations. In total, 33 repertory grid interviews were conducted, lasting between 45 and 90 minutes. The breakdown of interviews can be found in Table 2. All interviews were recorded and transcribed verbatim. The interviewees included both maintenance personnel (maintenance engineers, technicians, and operators) and managers (procurement managers, engineering managers, finance managers) of the four customer companies.

Table 2. Sample for repertory grid interviews

Customer companies	Hands-on maintenance personnel	Managers	Total
MedicaCo	6	3	9
PharmaCo	7	2	9
InsulaCo	5	3	8

MetalCo	5	2	7
			33

Data analysis

Based on the interview transcripts and grids, which provide a valuable source of qualitative and quantitative information, data analysis was conducted as described in Goffin *et al.* 2006. Further details about the data analysis and reliability checks can be found in (Goffin *et al.* 2012; Raja *et al*, 2012).

The data analysis involved the constructs being collated into categories (categorisation process). Based on the verbal explanations of the constructs in the transcripts, two researchers interpreted the constructs. Each construct and its related explanation were captured on cards and compared against other constructs by the two researchers. Common constructs were grouped into categories and were labelled as per their interpretations from the transcripts. A total of 272 constructs were elicited from the 33 respondents across four companies. These constructs were grouped into the 29 enhanced categories, which represented the value dimensions identified by customers of outsourced maintenance services. These value dimensions have been subdivided into tangible and intangible values and are shown in Table 3.

Reliability checks were performed by two other independent researchers at two different stages to ensure validity. The inter-coder reliability for these two re-coding stages was 78% and 83% which shows a reasonable degree of agreement among the researchers in categorisation process (Miles and Huberman, 1999; Jankowicz, 2003; Goffin *et al.*, 2012).

Table 3: Customer Value Dimensions

Tangible Values	**Intangible Values**
▪ Ability to Source ▪ Accessibility (of Service Provider) ▪ Cost Savings ▪ Delivery ▪ Feedback and Reporting ▪ Good Administration	▪ Communication ▪ Convenience ▪ Control ▪ Detailed Analysis ▪ Innovation ▪ Proactiveness (of Service Provider)

▪ Inventory Management ▪ Locality ▪ Nature of Contract ▪ Pricing ▪ Quality of Equipment ▪ Quality of Repairs ▪ Range of Product and Service Offerings ▪ Reliability (of Service Provider) ▪ Responsiveness ▪ Specialist Knowledge ▪ Support Systems ▪ Traceability	▪ Relational Dynamic ▪ Risk Averse ▪ Service Orientation ▪ Understanding Customer Business ▪ Urgency

Results

The repertory grid data has been analysed to provide an understanding of the value dimensions of maintenance services from a customer perspective. Firstly, a frequency and variability analysis has been performed on the repertory grid results to identify the most important value dimensions. Secondly, a detailed qualitative analysis of the interview transcripts was performed.

Frequency and Variability Analysis

A quantitative measure of the importance of each value dimension has been performed using two parameters: (i) frequency and (ii) variability as proposed by Goffin *et al.* (2006). ***Frequency*** is defined as the percentage of respondents who have mentioned constructs belonging to a value dimension. In line with Lemke *et al.* (2003), value dimensions with a frequency of greater than 25 per cent are identified as being important (Lemke *et al.,* 2003; Jankowicz, 2003; Goffin *et al.*, 2006). ***Variability*** is a mathematical measure of the spread of ratings for a construct (Goffin *et al.,* 2006). A higher spread of elements' ratings for a construct shows that the interviewee perceives it as a more important dimension. Goffin *et al*. (2006) caution that a high frequency may indicate that a value dimension is obvious to respondents, without being important, and a combination of frequency and variability will therefore be used to determine importance. The frequency and variability for each value dimension has been calculated for each of the case companies and the results are presented in

Appendix A. The variability for individual grids was calculated by using Idiogrid 2.4 software. The variability measure is dependent on the number of constructs in a grid which is different across grids. For example, if 8 constructs have been elicited from a respondent, the average variability would be 12.5% (i.e. 100/8), whereas if 5 constructs have been elicited in a grid, the average variability would be 20% (i.e.100/5). Therefore following the method proposed by Goffin *et al.* (2006), the variability calculated for single constructs was normalized across the grids by multiplying the variability of each construct by the number of constructs in that individual grid divided by the average number of constructs across all of the respondents for that company. The average normalized variability (ANV) for each value dimension was then calculated by taking the average across the normalized variability of the constructs that belong to each value dimension.

Finally, the criterion for importance baseline was calculated using the ANV (Goffin *et al.*, 2006). This is shown as BL (abbreviated for Base Line) in the Appendix A. This means that for instance in MedicaCo, the value dimensions with an ANV higher than 10.8 (BL) are considered to differentiate more strongly among the elements and therefore indicates higher importance for respondents. The value dimensions that have a frequency greater than 25% and an above average ANV are highlighted in bold typeface (see appendix A).

The overall results in Appendix A show the important value dimensions across all respondents. For example *Specialist Knowledge* was mentioned by 76% of all respondents and the ANV of 13.24 (which is higher than the Baseline overall ANV of 12.13). This indicates that *Specialist Knowledge* is an important value dimensions because it is mentioned by three quarters of respondents and their responses for this dimension ranged widely. In contrast *Responsiveness* was mentioned by 67% of respondents but the ANV was low (9.62) indicating that all suppliers are relatively similar in this regard, perhaps because all suppliers are responsive to their customers to some degree.

Table 4 summarizes the value dimensions with higher importance based on their combined frequency and variability ratings. The table shows, for example, that some value dimensions are important to all four companies e.g. *Accessibility* (*of Service Providers),* whereas others—such as *Feedback and Reporting*—are only important to the Specialist Metal company. These ratings help to differentiate the needs and expectations of the different companies. It should be noted that identifying value dimensions with higher importance does not mean that the value dimensions which do not meet the importance criteria should be neglected. In fact, it is essential to consider the overall picture of how customers perceive value rather than just focusing on important value dimensions.

Table 4. Important Value Dimensions based on Frequency and Variability

Ranking	MedicaCo	PharmaCo	InsulaCo	MetalCo	Overall
1	Specialist Knowledge	Accessibility (of service provider)	Accessibility (of service provider)	Feedback and reporting	Specialist Knowledge
2	Accessibility (of service provider)	Specialist Knowledge	Range of product and service offerings	Accessibility (of service provider)	Accessibility (of service provider)
3	Understanding customer's business	Locality	Relational Dynamic	Delivery	Relational Dynamic
4	Service Orientation	Range of product and service offerings	Locality	Pricing	Range of product and service offerings
5	Cost Savings	Control	administration	Urgency	Delivery
6	--	Cost Savings	Inventory management	Service Orientation	Pricing
7	--	Pricing	Service Orientation	Range of product and service offerings	Locality

Detailed Analysis

In the following section, the repertory grid results will be discussed in the context of the qualitative data that was gathered from the case companies. The analysis of individual value dimensions has been carried out with respect to their relating interview transcripts in order to

identify patterns in the dataset (Cassell and Walsh, 1994). We have focused on the dimensions that follow a meaningful pattern through our cases which could help enhance our understanding of value-adding process for maintenance services. The diverse range of value dimensions shows the necessity of taking into account more comprehensive value adding dimensions in order to meet customers' needs. The results have been grouped into common themes in the following sections to allow for comparison between value dimensions.

The Need for Specialist Knowledge and Control

Specialist Knowledge is one of the most important value dimensions to emerge from our research (overall frequency 76% and ANV 13.24). It highlights that when outsourcing maintenance activities, customers select servitized providers for their specialist knowledge of the services they provide. Similarly, *Understanding Customer's Business* (overall frequency 42% and ANV 10.63) has a relatively high frequency for all companies and a high importance for MedicaCo which highlights a desire for the service provider to engage with their customer's business needs.

However, the customer's desire to benefit from their suppliers' *Specialist Knowledge* leads to a sense of fear of losing control over internal competencies and expertise. It can be seen in the analysed data, that the dimension of *Control* has a moderate overall frequency (24%) and a high ANV (15.31). The maintenance manager for the MetalCo articulates the customers' fear of losing control: *"If it's something that I've sent out through to* [Service World] - *I have no control. The only control I've got is phoning* [Service World's on-site representative]*"*. The Engineering Coordinator in MetalCo elaborates a similar concern for outsourced repair jobs*: "I don't know where it's gone, I don't know how long it's going to be out for, how much it's going to cost, I don't know anything"*.

In summary, customers of maintenance services value the *Specialist Knowledge* of suppliers, but fear the loss of *Control* to them. Outsourced maintenance service suppliers therefore need to manage their customer's perception of losing control through effective feedback and reporting.

Financial Imperatives

It is surprising that *Cost Savings* has a relatively low frequency of mentions in our results (overall frequency 21%). However, closer examination reveals it is moderately important in PharmaCo and MedicaCo, less so to MetalCo and not mentioned by InsulaCo. This is in contrast with the commonly held cost-centric view of maintenance where "avoiding the costs of failure" is considered the main source of value for customers (Liyanage and Kumar, 2003; Al-Najjar, 2007). On the other hand, *Pricing* (overall frequency 36% and ANV 13.66) is perceived as important, indicating that customers are more focussed on the price of the service contract and spare parts than on the savings that the service contract can deliver. Despite the moderate importance of *Cost Savings*, many respondents mentioned this in the context of *Feedback and Reporting* (overall frequency 33%, ANV 11.87). It appears that giving customers a better understanding of cost control and financial aspects through consistent feedback can give them a sense of value.

Our research has shown that customers of outsourced maintenance services are more focussed on pricing than cost savings; however they do expect detailed feedback on financial aspects from the service provider to help them evaluate costs and benefits. This accentuates the importance of customers feeling in-control with better financial reporting and opportunities to negotiate prices of products and services.

Understanding Quality

Based on the responses from our case companies, we can divide quality into three areas: *Quality of Equipment*, *Quality of Repairs* and *Service Orientation*. *Quality of Equipment and Repairs* refer to the technical aspects of the provided services such as reliability and the ability of maintenance service provider to repair and restore equipment to as good as new condition. Whereas *Service Orientation* relates to the soft side of provided maintenance services and the human interfaces involved.

Interestingly, *Quality of Repairs* is not identified as an important dimension. It is one of the highest frequency dimensions for MetalCo (frequency 86%), but has a relatively low frequency and ANV for all other companies. This may indicate that in general all suppliers are able to deliver high quality repairs so it is not a differentiator between suppliers. Similarly, *Quality of Equipment* is even less important (overall frequency 9% and ANV 6.71), whereas *Service Orientation* has a moderately high overall frequency and variability, just below the threshold for an important dimension (overall frequency 39%, ANV 11.95). The Senior Procurement Consultant in PharmaCo highlights the effect of the suppliers' attitude on perception of service quality: *"suppliers can easily turn a negative into a positive by the way they handle the issue, so if there's a service failure and they handle it extremely well, often the client feels very positive about them bizarrely, missing the point slightly that they should have been an issue in the first place and that doesn't always happen"*. This shows that the soft side of quality incorporates human interactions and relationships that can be important to customer satisfaction. Lack of service consistency can have a very negative impact on the customer's perception of service and this can influence the customer's overall perception of value as commented by MetalCo's Engineering Manager: *"…there's no consistency in the response, some things take longer than we feel they should, some things exceed our expectations but overall things take longer than we would like"*.

Other value dimensions such as *Good Administration* (overall frequency 18%, ANV 8.98) and *Feedback and Reporting* (overall frequency 33%, ANV 11.87) contribute to the customers' experience of service quality. In summary, consistent quality of service over time is essential, particularly for customers who are in the mature phases of a supplier relationship.

The Importance of Intangible Value

As can be seen in the results Tables 3 and 4, intangible values are an important aspect of customer value. This is in line with the maintenance literature (Liyanage and Kumar, 2003; Markeset *et al.*, 2004). In fact, due to closer partnerships in the service setting, soft values emerge which must be taken into account in designing more value-adding services.

Relational Dynamic (overall frequency 45%, ANV 12.40) and *Service Orientation* (overall frequency 39%, ANV 11.95) are two of the most important value dimensions, especially for the companies in their initial phases of relationship. The importance of interpersonal relationships was repeatedly mentioned by respondents. For example, the Maintenance Manager in PharmaCo commented of a Service Representative: *"they dealt with him the whole time and they just made their phone calls when they wanted parts that were not available here, they went down by car and collected the parts. That's just a good relationship"*. In more mature phases of the relationship, the service supplier needs to develop an on-going strategic approach in managing the relationship with the customer. The risk to a long-term service provider is clearly apparent in comments of the Engineering Manager of MedicaCo (3-4 years into contract): *"*[We] *have had to have a relationship with* [Service World] *but I would see* [competing service supplier] *having put considerable effort into developing the relationship in the last 12 or 18 months as our business requirements and expectations have changed, they really stepped up their game and came with us"*. Among hands-on maintenance personnel *Convenience* (overall frequency 33%, ANV 9.63) was

mentioned by all companies, but with a relatively low ANV. For these staff the value of the service provider is to *"make my life easier"* and value is created through the daily interactions with the service provider.

A value dimension that can be difficult to assess is *Innovation* (overall frequency 21%, ANV 12.73). Innovation relates to the ability of a service provider to respond to their customer needs, present them with new ideas and differentiate themselves from competitors. This value dimension has been mentioned by both PharmaCo and MedicaCo managers who operate in tightly regulated environments where cost savings through the implementation of process and technological changes are complex. The Senior Procurement Consultant in PharmaCo comments: *"So in the next year and the next year you kind of look at innovation and working supplies to find cost opportunities"*.

Providing a wide *Range of Product and Service Offerings* (overall frequency 42%, ANV 15.00), is also perceived as a key value dimension in almost all cases. In particular, customers in a mature relationship with a service provider may request new service offerings to gain a continued sense of value.

In summary, intangible values contribute significantly to the customer's perception of the service they receive. These value attributes may be difficult to assess through performance indicators, but form an important part of the service value.

Accessibility and Responsiveness

Accessibility (of the Service Provider), *Delivery*, *Locality*, *Urgency* and *Responsiveness* relate to the physical presence and direct interactions between the service provider and the customer. As would be expected *Accessibility* (overall frequency 55%, ANV 16.00) and *Delivery* (overall frequency 39%, ANV 12.50) are two of the most important value dimensions. As previously mentioned, Service World assigns an on-site Service Representative (SR) in order to manage the customer-supplier relationships and act as the

single point of contact for provided maintenance services. This provides a high level of accessibility and responsiveness for Service World's customers. In most cases *Locality* (overall frequency 33%, ANV 17.70) refers to the geographical proximity of the service provider to the customer, but the perception of locality can also be satisfied by the on-site SR. Having an on-site SR who daily deals with the customers face-to-face, contributes to the perception of service quality as the Maintenance Manager of InsulaCo articulates: *"I guess the* [Service World] *team are in advantage ... That's almost their role in life to give quality service. It's all channelled through one person who is on site, so you play the right game; you get the consistent result from a guy".* The Engineering Coordinator in MetalCo also highlights the importance of supplier locality to the customer: *"Because they're closer ..., they'll come in, they'll collect the parts, they'll take it away, give you an update, repair the problem, get the part back to you, whereas* [competing service company] *obviously you have to arrange carriage to send it out to Germany, you've got all the running to do"*. The on-site representative can also enhance perception of *Accessibility* of service provider (a key value dimension in all four cases). This trend is seen especially at the hands-on personnel level as the Engineering Contractor in MedicaCo highlights: *"Well* [Service World] *would have* [SR] *on site every day, so it's a lot easier to deal with* [SR]*"*. In fact, having an on-site representative gives the customer the feeling of being taken care of and the perception of service provider's accessibility even though the on-site representative only acts as a point of contact for the supplier's services which may be geographically distant from the customer.

Discussion and Conclusions

This research has investigated the customer value dimensions of outsourced maintenance services. It has shown that customer companies' perception of value for maintenance services are based on a wide range of value contributors and that the balance of value dimensions is

diverse for different companies. Value dimensions may also change in different phases of the customer-supplier relationship, and at different levels of the organization. Furthermore, value dimensions are often interrelated and a supplier may find that by improving one measure of value another is reduced.

Most previous research into maintenance value has focused on financial considerations but our results show that intangible values can be as important as tangible values. Six of the seven overall *important* value dimensions are tangible values (Specialist Knowledge, Accessibility, Range of Product and Service Offerings, Delivery, Pricing and Locality) and one is intangible (Relational Dynamic). However, looking at the results for individual companies, five of the sixteen *important* dimensions are intangible (Relational Dynamic, Understanding the Customer's business, Urgency, Service Orientation and Control), and furthermore, the most important intangible value is different for each company. These findings show that customer values are diverse between different customers and that suppliers need to consider the particular needs of each customer when designing and delivering maintenance services. The long-term relationship between supplier and customer increases the need for service consistency, good feedback and reporting and ongoing service innovation. Customers of outsourced maintenance services need to ensure that they take into account the full range of value contributors when procuring maintenance services and suppliers need to ensure that they address the full range of value dimensions when providing integrated products and services for their customers. The methodology adopted in this research provides a structured approach that can be adopted by industry to assess maintenance value dimensions for a specific context (Martinez *et al.*, 2011).

Future Work

This research has shown the diverse nature of the value dimensions for outsourced maintenance services and the findings are being used in the development of a multi-criteria decision-making framework that can help companies to perform more informed maintenance outsourcing and continuously assess the value they receive through maintenance services (Toossi, 2011). This framework will also help suppliers to improve the value adding potential of their maintenance services through redesigning services based on value-in-use. Further work has also been undertaken to investigate the impact of value dimensions on customer satisfaction (Raja *et al.,* forthcoming). Future work will be required to generalize the findings in other maintenance contexts.

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Appendix A –Repertory Grid Analysis Results

Company	MedicaCo		PharmaCo		InsulaCo		MetalCo		Overall	
No. of Respondents	9		9		8		7		33	
Category	Freq. (%)	ANV	Freq. (%)	ANV	Freq. (%)	ANV	Freq. (%)	ANV	Freq. (%)	ANV
		(BL 10.8)		(BL 12.5)		(BL 14)		(BL 11.2)		(BL 12.13)
Ability to source	11	8.5	33	8	-	-	-	-	15	8.09
Accessibility (of service provider)	**33**	**13.6**	**56**	**18.2**	**75**	**14.4**	**57**	**18.9**	**55**	**16.00**
Communication	11	23	22	5.1	25	12.7	57	8	27	10.11
Control	11	31	**33**	**15.1**	13	12.1	29	9	24	15.31
Convenience	33	8.5	22	13	38	9.9	29	6.7	33	9.63
Cost Savings	**33**	**11.8**	**33**	**13.2**	-	-	14	16.3	21	12.14
Delivery	56	10.3	22	3.4	13	4	**43**	**20.1**	**39**	**12.50**
Detailed analysis	33	8.7	-	-	-	-	-	-	9	9.60
Feedback and reporting	44	10.5	-	-	25	11.7	**71**	**12.1**	33	11.87
Good Administration	11	3.9	11	7	**38**	**14.8**	14	4.25	18	8.98
Innovation	33	8.1	22	14.6	-	-	-	-	21	12.73
Inventory management	22	18.1	-	-	**25**	**16.2**	14	13.6	15	15.39
Locality	11	16.9	**44**	**17.3**	**38**	**16.2**	43	10.7	**33**	**17.70**
Nature of contract	22	14	-	-	13	16.5	-	-	9	13.87
Pricing	44	10.3	**33**	**12.7**	25	12.5	**43**	**18.9**	**36**	**13.66**
Proactiveness (of service provider)	11	4.84	22	10.7	13	13	14	21.8	15	12.72
Quality of equipment	-	-	-	-	25	11.2	14	0	9	6.71
Quality of repairs	11	10.7	22	9.3	13	6.8	86	5.9	33	7.18
Range of product and service offerings	22	14.7	**44**	**15.8**	**50**	**16.9**	**29**	**11.8**	**42**	**15.00**
Relational Dynamic	22	7.6	56	12.1	**38**	**21**	14	4.1	**45**	**12.40**
Reliability (of service provider)	44	6.5	11	12.4	25	12.2	-	-	21	10.01
Responsiveness	44	8.4	44	9.6	88	13.1	86	10.1	67	9.62

Risk adverse	22	12.9	11	24.5	-	-	-	-	9	17.45
Service Orientation	**33**	**12.6**	33	8.8	**25**	**14.5**	**29**	**12.5**	39	11.95
Specialist Knowledge	**56**	**13.4**	**56**	**16.8**	50	13.4	71	8.8	**76**	**13.24**
Support Systems	56	7.7	-	-	13	21.7	-	-	18	10.25
Traceability	22	4.7	-	-	-	-	14	31.5	9	14.05
Understanding customer business	**33**	**12.8**	56	9.7	13	12.2	43	7.4	42	10.63
Urgency	22	9.6	11	11.9	13	14.3	**43**	**13.1**	21	12.07
Notes: (1) Important categories are highlighted in Bold typeface (2) BL refers to the Baseline variability for each company (3) ANV: Average Normalised Variability										